

Comitato
per una Civiltà dell'Amore

**Fb and Youtube Streaming Conference
for Economy of Francesco
March, 28 20120**

ECOLOGICAL INTEGRAL TRANSITION FOR CONTAINMENT OF POLLUTANT EMISSIONS AND GREEN-HOUSE GASES

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Complete Report in English available for download from WEB site

ECOLOGICAL TRANSITION AND **SUSTAINABILITY: DEFINITIONS**

- Ecological integral transition is a step of human development in which the use of energy and matter for human needs and human activities is made sustainable , that is in equilibrium with earth planet naturally available resources.
- Energetic transition is the progressive substitution of non eco-sustainable sources with eco-sustainable sources
- The eco-sustainability takes into account the depletion of primary non renewable resources and the impact on the environment (the Creation, for Believers) leading to unreversable damage for mankind and his habitat.

ECOLOGICAL TRANSITION AND HUMAN PROGRESS

- Atmosphere
- Landscape
- Waters
- Foot-print of human works
- **Human development and progress**
- **Economy of Francesco**



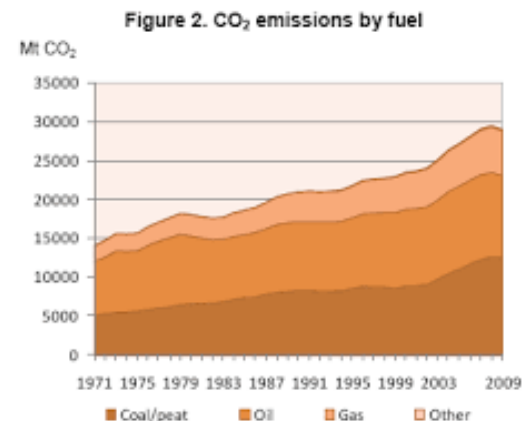
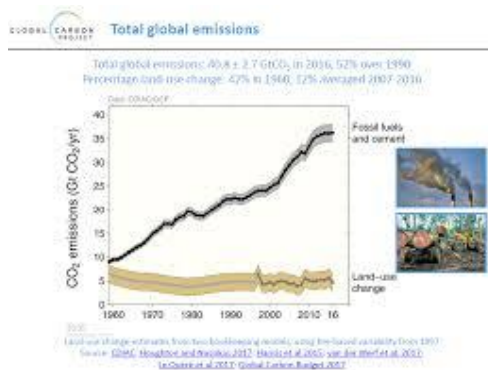
ECOLOGICAL TRANSITION AND GENERATIONAL PACT



Greta Thunberg on nuclear power

"Personally I am against nuclear power, but **according to the IPCC [the United Nations Inter-governmental Panel on Climate Change], it can be a small part of a very big new carbon free energy solution, especially in countries and areas that lack the possibility of a full scale renewable energy supply - - let's leave that debate until we start looking at the full picture.**"

---Greta Thunberg, founder, Youth Climate Strike



ENERGY TRANSITION

NON RENEWABLES

CARBON POWER (FOSSIL FUEL)

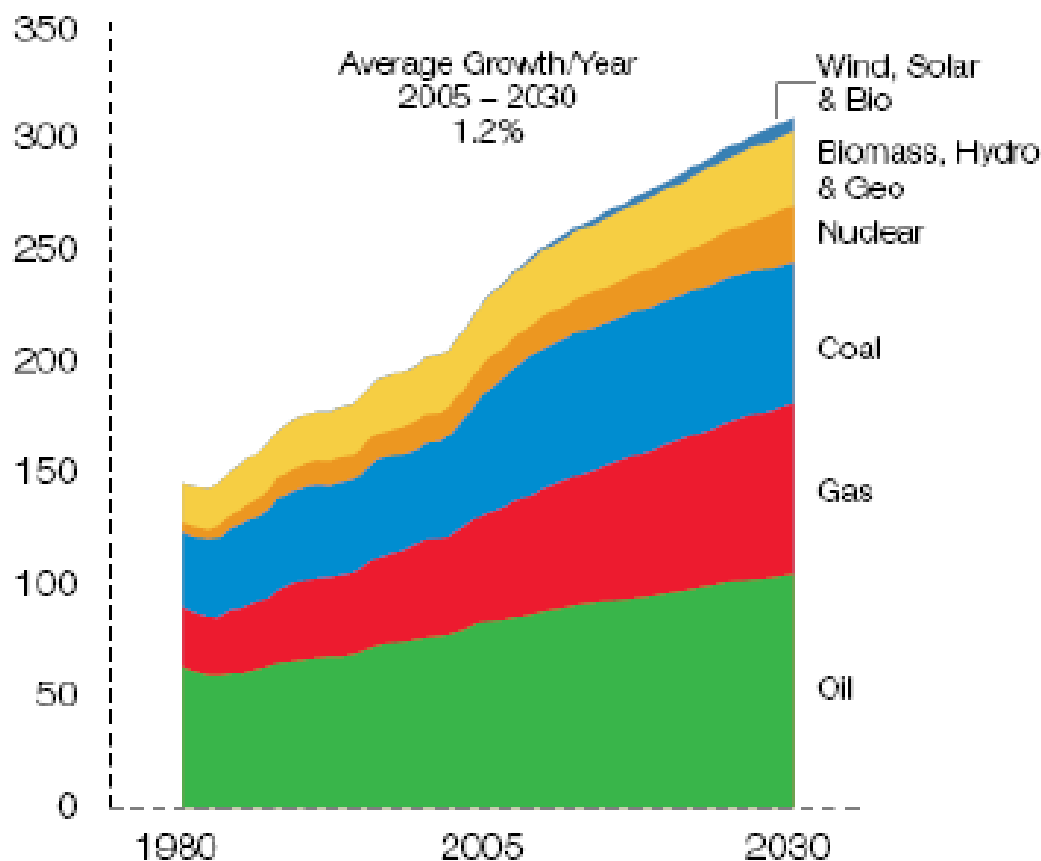
- Coal, fuel oil, natural gas: hard to replace
- **80% energia primaria**
- Carbone la peggiore, gas la migliore
- Dust (lung disease)
- VOC (Volatile Organic Compounds)
- Green house gas – CO₂
- Antropic climate change
- Acid rains (Sox, Nox, NH_x, ...)
- Drilling landscape impact (augers, fracking for shale-gas)



CURRENT ENERGY MIX AND CO2 EMISSIONS

energy demand

MBDOE



CO₂ emissions

billion metric tons

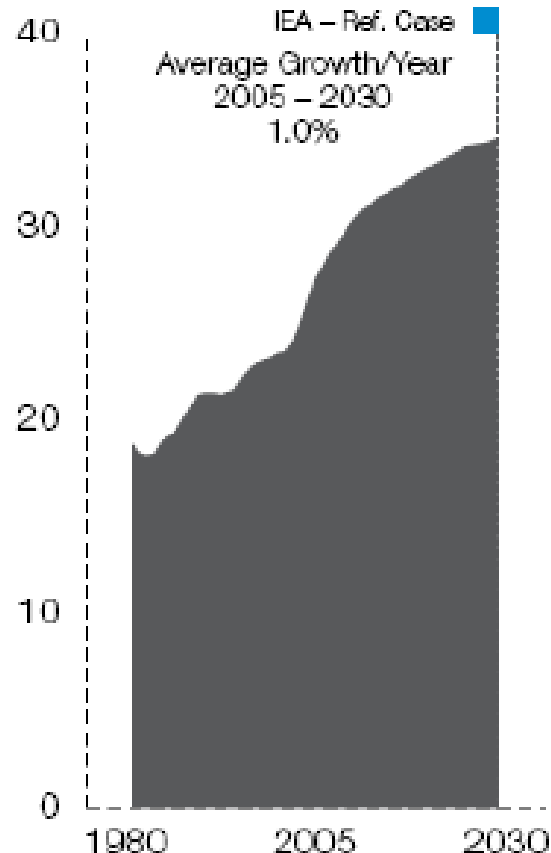
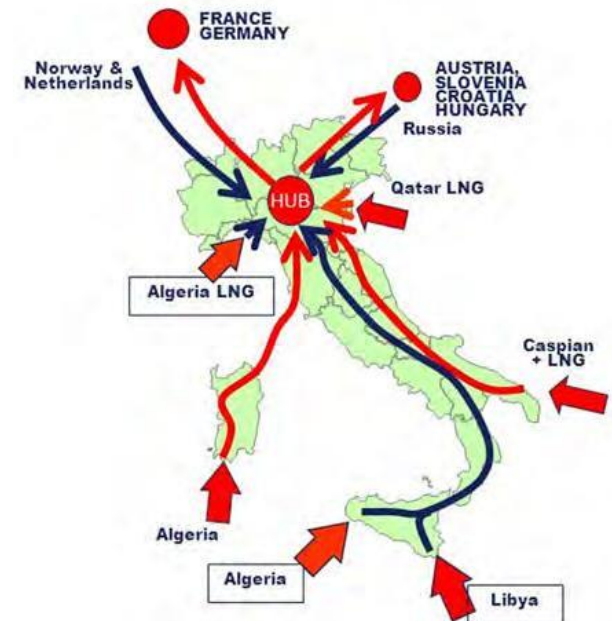
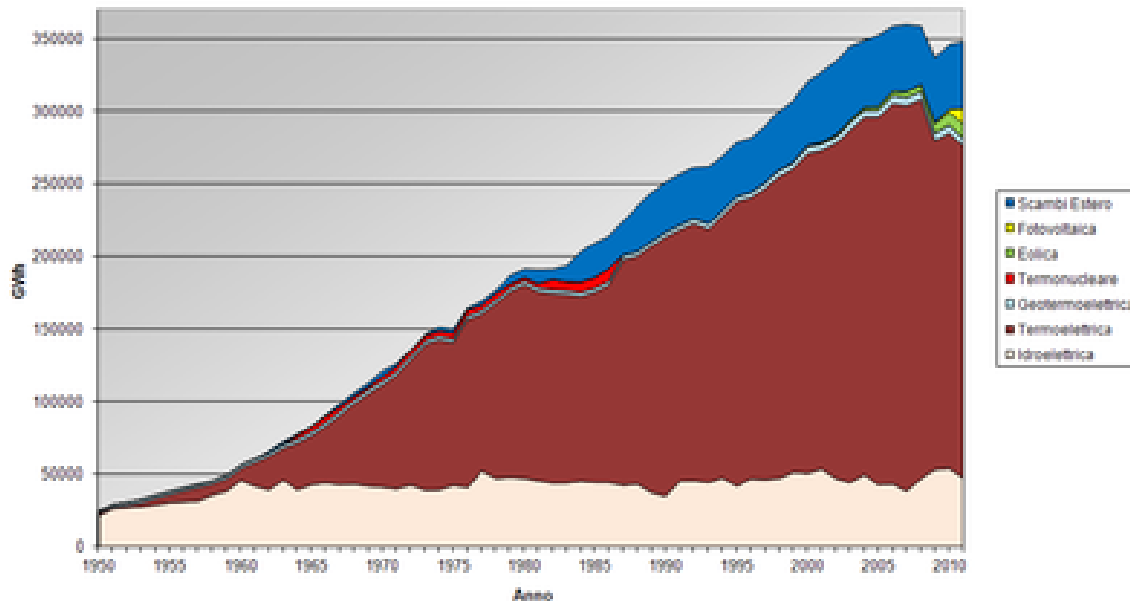


Fig. 11 – Andamenti dal 1980 al 2030 della domanda giornaliera di energia, articolata per tipo di fonte (MBDOE: Million Barrels per Day of Oil-equivalent Energy), e delle emissioni annuali di CO₂. IEA - Ref. Case: Reference Case considered by the International Energy Agency. (Da: ExxonMobil "The Outlook for Energy - A View to 2030" December 2008).

NATURAL GAS

- Transition fossil fuel, in continuous increase
- It's still a green house source but less polluting than coal and oil
- Currently it's 50 - 60% of primary energy (I)

Riepilogo Storico della Produzione di Energia in Italia



RENEWABLE (DE-CARBONIZED) POWER



HYDRO POWER



Hydropower uses the gravity and water force to produce electric power by hydraulic turbine equipped dam facilities, located on big rivers in the plains, as well as downstream slopes through penstocks fed by mountain basins.

Apart from the impact on landscape, which is not so burdensome in normal operation, hydropower had in the past accidents due to the rupture and break-down / collapse of the dam causing thousand of victims.

Contribution of this source, usually 10-15 % of the mix, is limited by the orography of the territory and difficult to increment further.

In some Country is very high, like in Norway (100%), or Sweden (50%), while in Italy is somewhat 20%



SOLAR AND WIND POWER

- 0 emissions (during power production)
- Intermittent, not programmable
- Low load factor (10 %)
- Centered hourly or periodically
- Electrical grid oscillation and instability up to partitioning and black out
- Low power density requiring great land spreading under the same installed electric power.
- Capacity payment, from fossil fuel
- Limited capacity factor in the energy mix
- Need of energy storage
- Landscape degradation
- Noise (wind only)
- Energetic balance over all life cycle

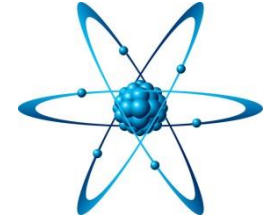


GEO THERMAL POWER



- Endless, continuous and stable
- Electric production (Iceland, Larderello)
- Thermal production
- District heating (Ferrara)
- Drilling competence needed
- Possible toxic emissions (some cases)
- Initial investment

NUCLEAR POWER



- Large power
- Stable production
- High load factor
- 0 Emissions
- Low footprint
- Advanced technology
- Nuclear safety
- Radioactive waste management
- **Gen IV reactors for a sustainable closed nuclear fuel cycle**
- **Conversion of nuclear weapons into civil power production**

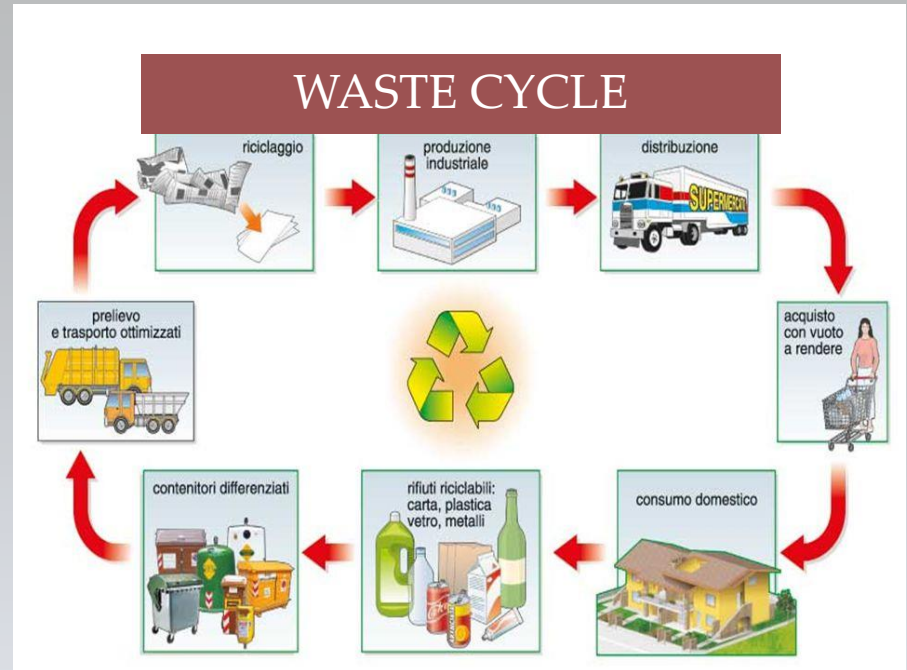


HYDROGEN POWER

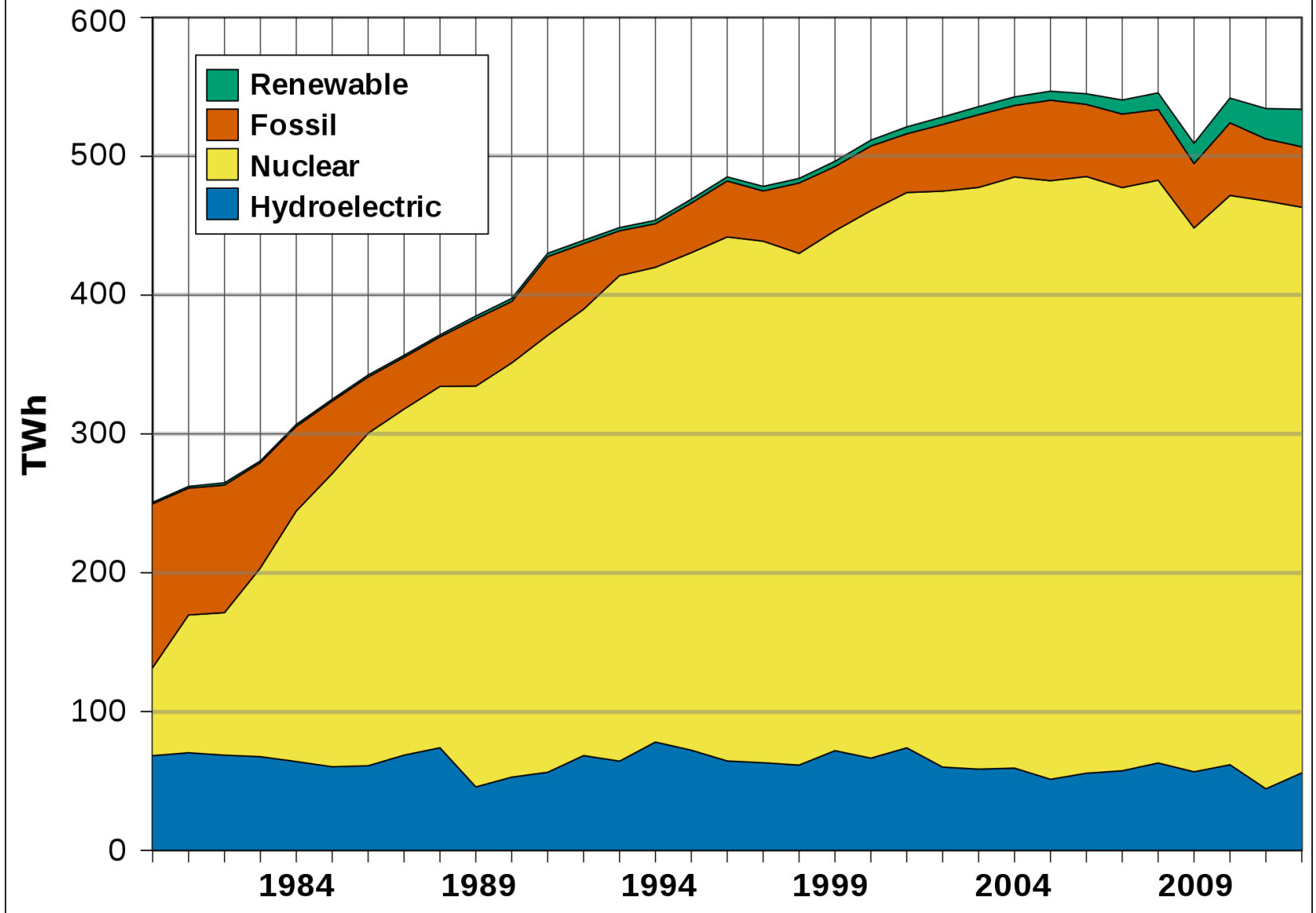


- It's not an energy primary source but a vector
- Produced by electrolysis or thermochemical dissociation from nuclear or solar or fossil power
- Steam-reforming
- Hydrogen combustion product is water (steam)
- In automotive, it can be generated by fuel-cells, that is hydrogen batteries
- Beyond some concentration becomes explosive
- It has to be distributed like gas, by pipelines

POWER FROM WASTE



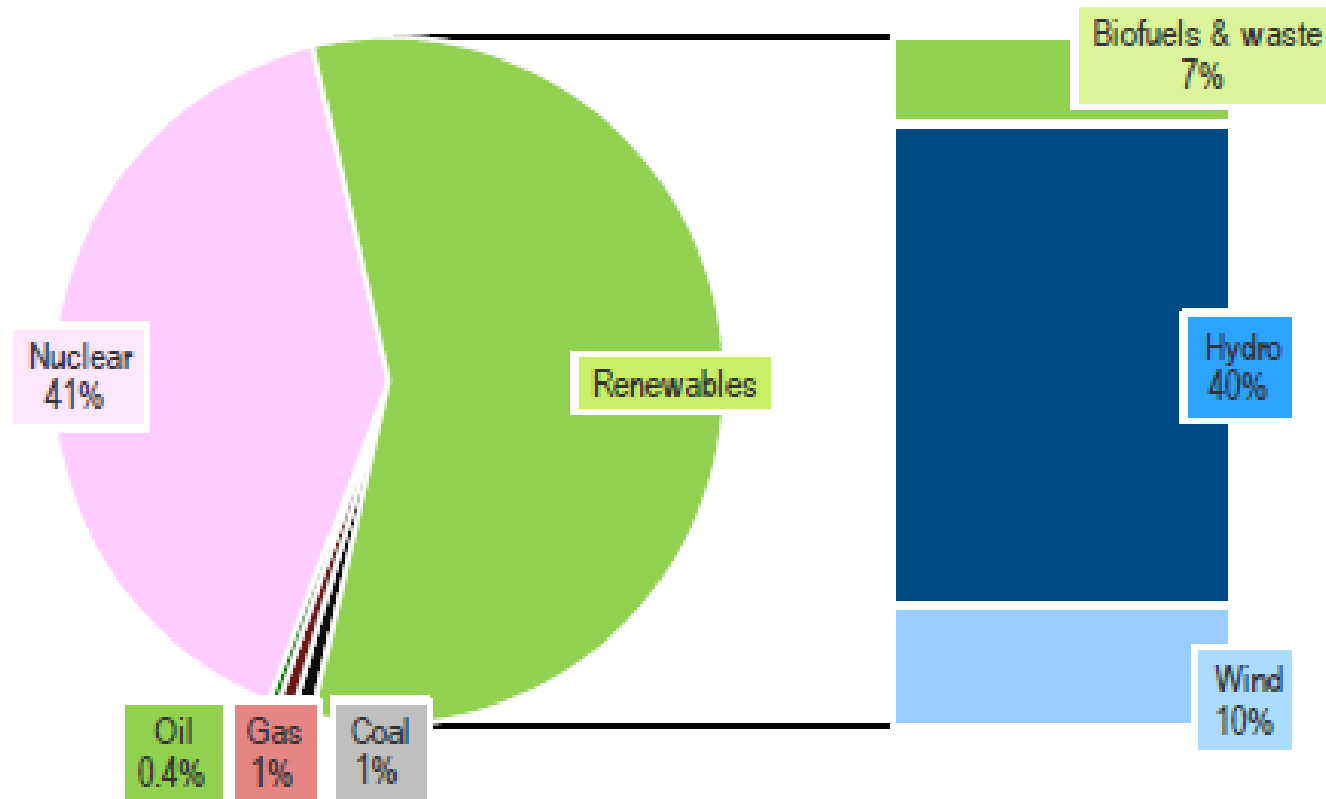
Electricity production in France



Two success stories: Sweden and France

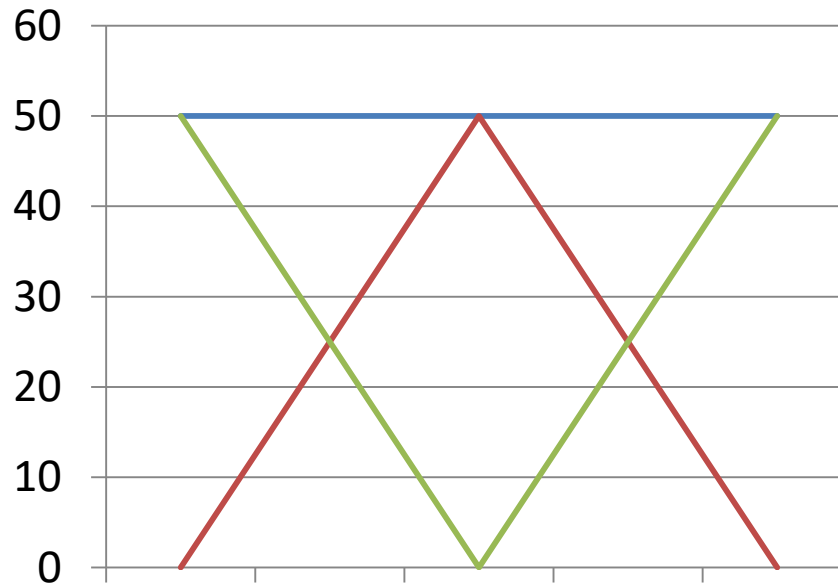
ELECTRICITY GENERATION: 154.8 TWh

57% renewables (IEA average: 24%)



ENERGY (POWER) MIX (OPTIMUM)

Fabbisogno (%)



Mezzanotte

Mezzogiorno

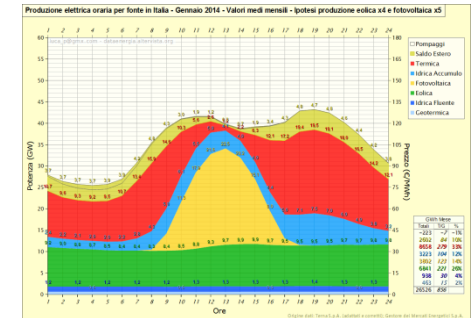
Mezzanotte

Ore del giorno

— Nucleare e idro

— FER

— Fossile



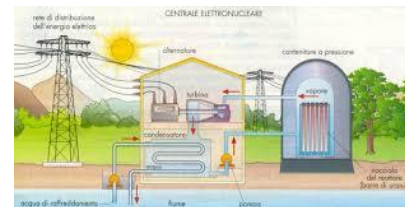
ECOLOGICAL TRANSITION AND WARHEAD CONVERSION

- ❑ 20000 warheads converted into fuel to produce electricity
- ❑ A terrible risk of death transformed into chance of life and social progress.
- ❑ A result to be applied to other 15.000 warheads to get electric power provision for 100 bis cities like Milan
- ❑ An example of peaceful scope, carbon-free, non polluting, non green-house effect

Converting 15.000 warheads allows to produce 100.000 MWe electric energy for civilian use and save 15.000.000 Ton CO₂ in atmosphere, that is 1000 Tons per converted warhead.

If then adding the 100 reactors to the 400 now in operation, we get a saved CO₂ equal to: 15 Mton x 5 = 75 Mton / per core (5 years refuelling)

It's a fear contribution to save CO₂ from electric power sector, even though still few comared with the almost 25 Gton totally released by fossil fuel every year , but high important as symbolic value for peace



ECOLOGICAL TRANSITION USING WEAPON CONVERSION

MAIN REFERENCES

PONTIFICIA ACCADEMIA DELLE SCIENZE
SCRIPTA VARIA 115



spirito 1986 - 2019
di 

Assisi

Dare un'anima
all'economia

Assisi
25 - 27
OTTOBRE
2019

... Uno Strumento della Tua PACE

VENERDI' 25 OTTOBRE

- **SALONE PAPALE DEL SACRO CONVENTO** ore 10.15 - 12.30
Confronto teologico sul tema: *Quale economia a partire dalle fedi*
Introduzione della Prof. Annarita Caponera e Tavola rotonda con: Yasmin Doghri, musulmana; - Alessandro Busti, baha'i; - Alessio Lanfalone, cattolico; - Graziano Di Nepi, ebreo. In collaborazione con l'Istituto Teologico di Assisi e l'Ufficio Scuola della diocesi
- **CITTÀ DELLA PACE - SALA SAN GIOVANNI** ore 15.00
Incontro dei musicisti pellegrini con i rappresentanti delle religioni
il vescovo insieme agli altri rappresentanti.
- **BASILICA INFERIORE DI SAN FRANCESCO** ore 21.00 Concerto di chitarra classica - Marco Socias

SABATO 26 OTTOBRE

- **SALA STAMPA DEL SACRO CONVENTO** - ore 9.00 - 13.00
Convegno *Civiltà dell'amore: La Civiltà dell'Amore per lo sviluppo Ambientale e Sociale*
Flaminia Giovannelli, Massimo Sepielli, Carlo De Masi, Antonio Brunon, Rocco Morelli.
- **CHIESA DI S. PIETRO** ore 21.00 Concerto - Iberian Folk Ensemble

DOMENICA 27 OTTOBRE

- **BASILICA SUPERIORE DI S. FRANCESCO** ore 12.00 Celebrazione eucaristica
Preside Mons. Domenico Sorrentino
- **RETTORATO DEL CONVENTO DELLA PORZINCOIA** (S. Maria degli Angeli) ore 16.00
Preghiera per la pace
vescovo Domenico Sorrentino; revd. dr. Simon Cockedge, anglicano; rav Joseph Levi, presidente Scuola fiorentina di alta formazione per il dialogo interreligioso e culturale; Maurizio Ciarruglia, Baha'i Assisi; Stella Yousif Milad, copto ortodosso; - Abdel Qader, imam; - Pavl Gajewsky, pastore valdese
- **BASILICA SUPERIORE DI SAN FRANCESCO** ore 21.00 - *Francesco e il Sultano* - testo di Peter Dehler, musiche di Fausto Tusciano

Giornata di Studio su

Disarmo Nucleare, Non-proliferazione, e sviluppo

10 febbraio 2010
Casina Pio IV, Città del Vaticano

VERSIONE IN LINGUA ITALIANA
INTEGRATA DA:

Programma Conversione delle armi nucleari in progetti di sviluppo nei Paesi Poveri

Presentato al Simposio di Assisi
Sacro Convento - 11 novembre 2011



Comitato
per una Civiltà dell'Amore

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PROGRAMMA PRELIMINARE
CONVEGNO

PROGETTI DI PACE NUCLEARE DALL'AREA COREANA ALLE ALTRE NEL MONDO

LA VIA DELLA PACE: DALL'EUROPA ALL'ESTREMO ORIENTE

8 maggio 2019, ore 9:00 – 16:30

*Istituto Maria Santissima Bambina
Via Paolo VI, 21 – 00120 Città del Vaticano*

Analisi tecnica della conversione testate nucleari in combustibile per impianti elettronucleari

Massimo Sepielli (Esperto nucleare piattaforma Europea SNE-TP)

in collaborazione con

Flavio Parozzi, Franco Polidoro (Esperti CISE2007)

Energia per l'Umanità - Quali prospettive per il futuro?

WORLD POPULATION IN MAJOR AREAS

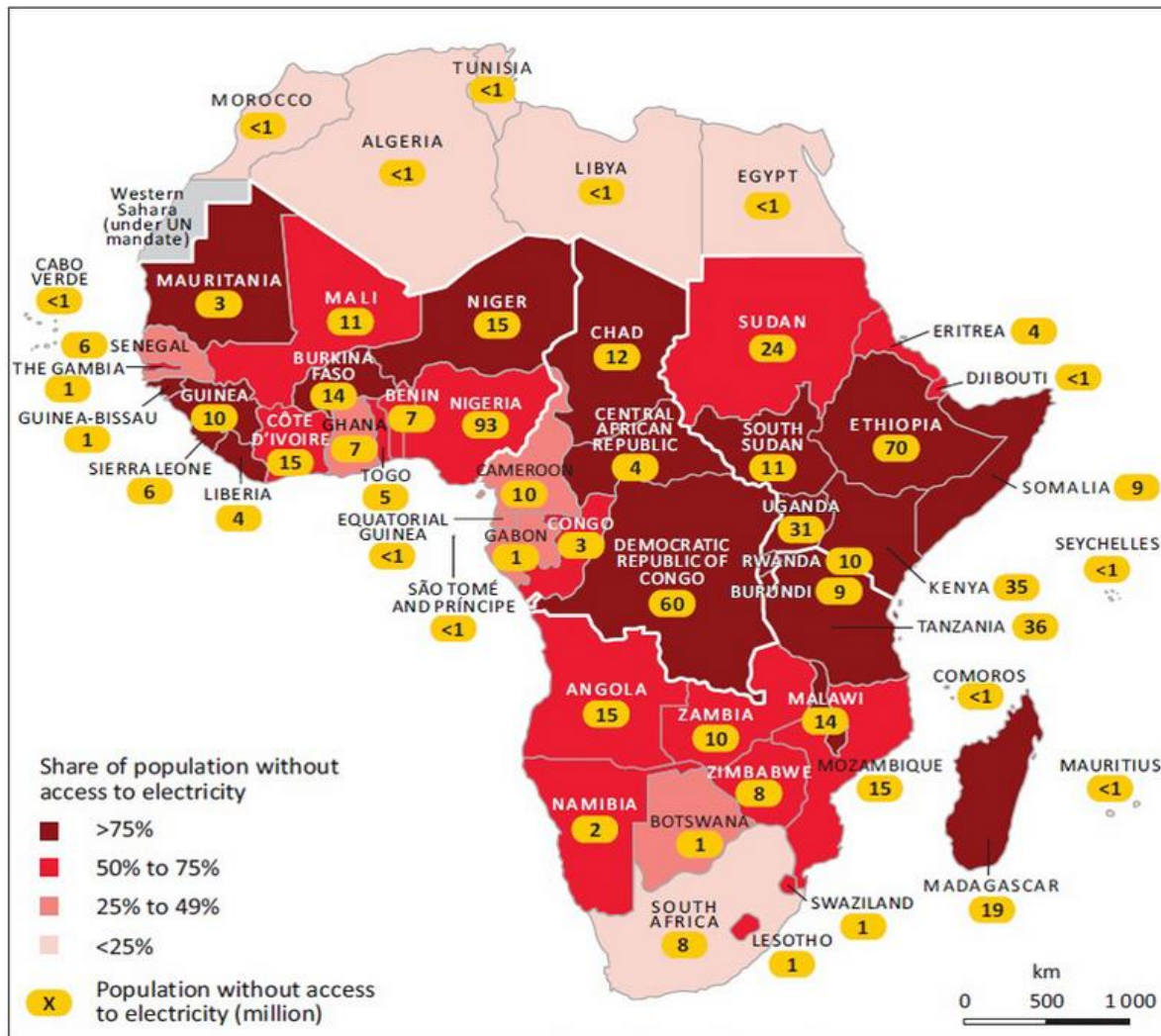
TABLE 1. POPULATION OF THE WORLD AND MAJOR AREAS, 2015, 2030, 2050 AND 2100,
ACCORDING TO THE MEDIUM-VARIANT PROJECTION

<i>Major area</i>	<i>Population (millions)</i>			
	<i>2015</i>	<i>2030</i>	<i>2050</i>	<i>2100</i>
World	7 349	8 501	9 725	11 213
Africa	1 186	1 679	2 478	4 387
Asia	4 393	4 923	5 267	4 889
Europe	738	734	707	646
Latin America and the Caribbean	634	721	784	721
Northern America	358	396	433	500
Oceania	39	47	57	71

Source: United Nations, Department of Economic and Social Affairs, Population Division (2015).
World Population Prospects: The 2015 Revision. New York: United Nations.

Il caso dell'Africa

ACCESS TO ELECTRICITY



This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

The consequences on ecosystems

- ❑ During the twentieth century the world population **has quadrupled and its energy consumption has multiplied by 16.**
- ❑ Most of this energy comes from the **burning of fossil fuels**, with the consequent release into the atmosphere of a growing flow of carbon dioxide (CO₂).
- ❑ From the pre-industrial era to 2020, the concentration of carbon dioxide in the atmosphere has gone from **around 275 to 410 parts per million (ppm), and continues to grow at the rate of 2 or 3 ppm / year.**
- ❑ If we also take into account the other greenhouse gases, such as methane and nitrogen oxide, and aerosols, and we report the effect in equivalent CO₂, the total concentration now reaches **500 ppm of CO₂ eq.**
- ❑ The dynamic correlations between the main climatological variables are essentially of the **integral type**, i.e. the downstream variable is the integral of the upstream one, except for the presence of **stabilizing feedbacks with more or less long time constants.**
- ❑ Based on these correlations, for an instantaneous introduction (or subtraction) of CO₂ into the atmosphere, **92% is still present (or removed) after a year, 64% after 10 years, 34% after 100 years, and the 19% after 1000 years.**

Actions on CO2 concentration

- ❑ Every year we increase the concentration of CO2 in the atmosphere **by about 2 ppm , that 1 ppm of CO2 corresponds to the maximum 7.82 GtCO2.**
- ❑ This quantity has led to an excess of CO2 which has already begun to devastate our planet.
- ❑ Therefore it is necessary as soon as possible to stop the emissions of other CO2 in all possible ways and places in order **not to reach the expected devastating 500ppm (almost double the natural value) of CO2 in the air.**
- ❑ This can be done by replacing the combustion of fossils (materials that are very useful for irreplaceable uses even for future humanity) the use of sources without GHG emissions, such as **hydraulic energy, other renewable carbon-free products and nuclear energy in a optimal energy mix**
- ❑ Furthermore, these plants can produce **hydrogen** which can effectively fuel transport of almost any kind and thus almost eliminate zero greenhouse gas emissions in the air. Major role of the introduction of new CO2 will grow from the development of **emerging Countries.**
- ❑ Necessary for the more developed countries to drastically favor a development with carbon free energies, for example **by allocating at least 10% of the European Environment Fund, just allocated by the EU for the next 10 years**
- ❑ The energy transition with the determination to cancel all fossil combustion as soon as possible to all nations and reach **the elimination of new emissions.**

CO2, forestation and reforestation

- ❑ Thus CO2 would not grow even more but would remain at these values if we do not intervene to reduce it first of all by promoting new **forestation and reforestation in all areas of the planet.**
- ❑ Reforest such a surface (which is equivalent to the burned or destroyed part of the tropical forests in the last 50 years) and to reconstitute a forest formation to implement the **reduction of 2 ppm of CO2 / year.**
- ❑ So since the new anthropogenic emissions are **zeroed**, following the best intentions of countries in the world, we will reduce the concentration of CO2 in the air by **40 ppm in the following 20 years.**
- ❑ If emissions continue at the current levels, with a consequent increase of 2ppm per year in the concentration of CO2, the aforesaid reforestation, once fully operational, could perhaps **just compensate for that increase.**

Open questions

How long will this transition phase last?

How much CO₂ production can it save?

Will it be possible to keep the concentration value within the limit value of 500 ppm, starting from the current 270 ppm?

What can geoengineering do?

Relatore Ing. Massimo Sepielli

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Curriculum Vitae

- Perito nucleare (1977)
- Dottore in Ingegneria nucleare (1983)
- Abilitato (1984)
- Iscrizione all'Ordine (1984)
- Specializzato Sicurezza impianti nucleari e radioprotezione (1987)
- Presidente Commissione Ricerca e reattori innovativi dell'Area Nucleare dell'Ordine degli Ingegneri della Provincia di Roma
- **ENEA (1983)**
- **Dipartimento Reattori termici**
- **Dipartimento Energia**
- **Calcolo e modellistica**
- **Grande Servizio Paese 2 – RAD**
- **Dipartimento Fusione e Presidio Nucleare**
- **Direttore Responsabile (2010-2015) Tecnologie Fissione e Gestione Materiale nucleare**
- **Esercente reattori di ricerca ENEA Triga e Tapiro e DdL**
- **Delegato Italiano GB SNETP (CE-Euratom)**
- **Presidente SC1 UNICEN**
- **Italian Officer NEA**
- **Commissione I&C IAEA**
- **Esperto nucleare Comitato MiSE D.U.**

